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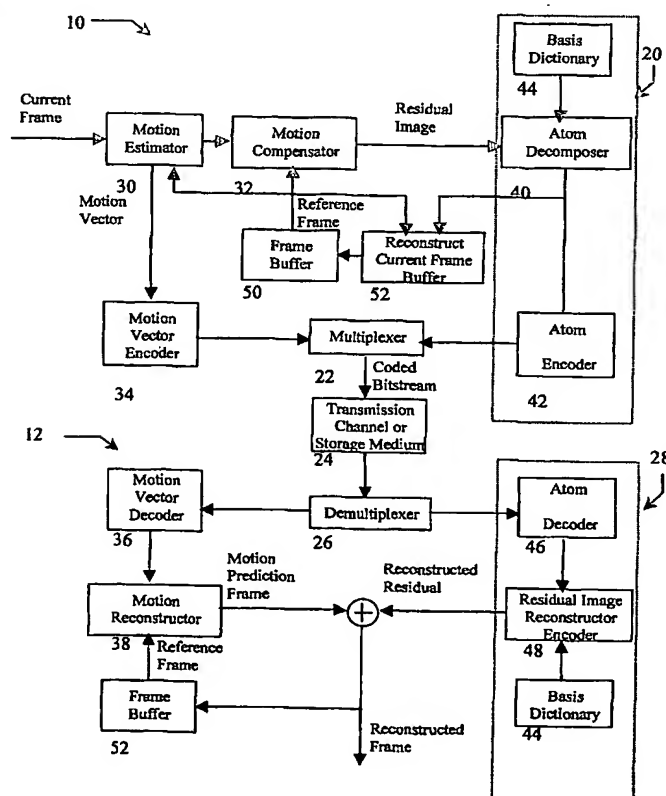
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(54) Title: **OVERCOMPLETE BASIS TRANSFORM-BASED MOTION RESIDUAL FRAME CODING METHOD AND APPARATUS FOR VIDEO COMPRESSION**

(57) Abstract: The present invention provides a method to compress digital moving pictures or video signals based on an overcomplete basis transform using a modified Matching Pursuit algorithm. More particularly, this invention focuses on the efficient coding of the motion residual image, which is generated by the process of motion estimation and compensation. A residual energy segmentation algorithm (RESA) can be used to obtain an initial estimate of the shape and position of high-energy regions in the residual image. A progressive elimination algorithm (PEA) can be used to reduce the number of matching evaluations in the matching pursuits process. RESA and PEA can speed up the encoder by many times for finding the matched basis from the pre-specified overcomplete basis dictionary. Three parameters of the matched pattern form an atom, which defines the index into the dictionary and the position of the selected basis, as well as the inner product between the chosen basis pattern and the residual signal. The present invention provides a new atom position coding method using quad tree like techniques and a new atom modulus quantization scheme. A simple and efficient adaptive mechanism is provided for the quantization and position coding design to allow a system according to the present invention to operate properly in low, medium and high bit rate situations. These new algorithm components can result in a faster encoding process and improved compression performance over previous matching pursuit based video coders.



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